

WHAT IS CLAIMED IS

1. A method of forming an oxide-nitride-oxide layer in a non-volatile memory device, comprising the steps of:

providing a silicon substrate;

5 forming a bottom oxide layer on the silicon substrate;

depositing a silicon-rich nitride layer on the bottom oxide layer; and

performing an oxidation process to react with silicon atoms in the silicon-rich nitride layer, so as to form a top oxide layer.

2. The method for forming an oxide-nitride-oxide layer in a non-volatile memory device of Claim 1, wherein the bottom oxide layer is of a thickness between 10 and 100 angstroms.

3. The method for forming an oxide-nitride-oxide layer in a non-volatile memory device of Claim 1, wherein the silicon-rich nitride layer is of a thickness between 10 and 200 angstroms.

4. The method for forming an oxide-nitride-oxide layer in a non-volatile memory device of Claim 1, wherein the oxidation process is conducted at a temperature between 700 and 1100°C.

5. The method for forming an oxide-nitride-oxide layer in a non-volatile memory device of Claim 1, wherein the top oxide layer is of a thickness between 20 and 200 angstroms.

6. The method for forming an oxide-nitride-oxide layer in a non-volatile memory device of Claim 1, further comprising the step of depositing a first oxide layer on the silicon-rich nitride layer before the oxidation process is performed.

7. The method for forming an oxide-nitride-oxide layer in a non-volatile memory device of Claim 6, wherein the first oxide layer is a

part of the top oxide layer.

8. The method for forming an oxide-nitride-oxide layer in a non-volatile memory device of Claim 6, wherein the first oxide layer is made of high-temperature oxide.

5 9. The method for forming an oxide-nitride-oxide layer in a non-volatile memory device of Claim 6, wherein the first oxide layer is deposited by chemical vapor deposition.

10 10. The method for forming an oxide-nitride-oxide layer in a non-volatile memory device of Claim 6, wherein the first oxide layer is of a thickness between 10 and 100 angstroms.

11. A method for forming an oxide-nitride-oxide layer in a non-volatile memory device, comprising the steps of:

providing a silicon substrate;

forming a bottom oxide layer on the silicon substrate;

15 depositing a nitride layer on the bottom oxide layer;

depositing a polysilicon layer on the nitride layer; and

performing an oxidation process to react with the polysilicon layer, so as to form a top oxide layer.

20 12. The method for forming an oxide-nitride-oxide layer in a non-volatile memory device of Claim 11, wherein the nitride layer is of a thickness between 10 and 200 angstroms.

13. The method for forming an oxide-nitride-oxide layer in a non-volatile memory device of Claim 11, wherein the polysilicon layer is of a thickness between 10 and 100 angstroms.

25 14. The method for forming an oxide-nitride-oxide layer in a non-volatile memory device of Claim 11, further comprising the step of

depositing a first oxide layer on the polysilicon layer before the oxidation process is performed.

15 15. The method for forming an oxide-nitride-oxide layer in a non-volatile memory device of Claim 14, wherein the first oxide layer is a part of the top oxide layer.

16. The method for forming an oxide-nitride-oxide layer in a non-volatile memory device of Claim 14, wherein the first oxide layer is made of high-temperature oxide.

10 17. A method for forming an oxide-nitride-oxide layer in a non-volatile memory device, comprising the steps of:

providing a silicon substrate;

forming a bottom oxide layer on the silicon substrate;

depositing a polysilicon layer on the bottom oxide layer;

depositing a nitride layer on the polysilicon layer; and

15 performing an oxidation process, so as to form a top oxide layer.

18. The method for forming an oxide-nitride-oxide layer in a non-volatile memory device of Claim 17, further comprising the step of depositing a first oxide layer on the nitride layer before the oxidation process is performed.

20 19. The method for forming an oxide-nitride-oxide layer in a non-volatile memory device of Claim 18, wherein the first oxide layer is a part of the top oxide layer.

20. The method for forming an oxide-nitride-oxide layer in a non-volatile memory device of Claim 17, wherein the nitride layer is of a thickness between 20 and 50 angstroms.

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